AMENDMENTS TO THE SPECIFICATION

Paragraph [0022] of the specification is amended to read as follows:

Referring now to Figure 1, a partial cross section view of an optoelectronic assembly 100 for a computer system is depicted having an electronic chip or chips 110 (alternatively referred to as a chip set), a substrate (alternatively referred to as a first level package) 120 having a first surface 122 in signal communication with electronic chip 110 via a suitable electrical connection 130 (such as C4 micro solder ball interconnect technology, for example), an electrical circuit via metallization layer 140 in signal communication with substrate 120 via electrical connection 130, an optoelectronic transducer (O/E) 160 in signal communication with a driver or receiver chip 150 via metallization layer 140, and optical coupling guides 170 (such as alignment pins for an MT (mechanical transfer) ferrule 172, or other pluggable optical connector ferrule, for example) for aligning optoelectronic transducer 160 with an optical circuit 175, such as a fiber optic cable or bundle, for example. Also depicted in Figure 1 is a printed circuit board (alternatively referred to as a second level package or second substrate) 180 in signal communication with a second surface 124 of substrate 120 via a suitable electrical connection 190 (such as column or ball- grid-array connections, ceramic-ball-grid-array (CBGA) or land grid array (LGA), for example), for providing power and communicating signals to and from electronic chip 110 and substrate 120 from and to other components of the computer system. This electrical connection could also include a pluggable high-speed electrical connector, in order that the optoelectronic assembly 100 could be removed from the second substrate (MCM or FR4 circuit board). However, in accordance with an embodiment of the invention, electrical signals to and from electronic chip 110 may also be communicated from and to optoelectronic transducer 160 via substrate 120 and directly to electrical circuit 140, thereby bypassing printed circuit board 180. A decoupling capacitor 192, for example, or other passive device may be electrically coupled to substrate 120 via another metallization layer 194 opposing metallization layer 140. First surface 122 of substrate 120 is further defined by a cavity surface 126, which will be discussed herein below. While reference is made herein to

signal communication from electronic chip 110 to optoelectronic transducer 160, it will be appreciated that the signal flow is bi-directional, where optoelectronic transducer 160 converts the outbound electrical data signals generated from electronic chip 110 into optical signals (e/o conversion), and inbound optical data signals into electrical signals (o/e conversion).

Paragraph [0025] of the specification is amended to read as follows:

Optoelectronic transducer 160 may include a support IC (integrated circuit) 210 that may be integrally arranged with optoelectronic transducer 160. Support IC 210 is electrically connected between electrical circuit metallization layer 140 and optoelectronic transducer 160 for communicating the electrical signals therebetween. In an embodiment, optoelectronic transducer 160 includes a laser, a vertical cavity surface emitting laser (VCSEL), a light emitting diode, or a photodiode (PD) array, in signal communication with support IC 210 for receiving an electrical signal therefrom and for generating an optical signal in response thereto or for receiving a light signal and for generating an electrical signal in response thereto. The output of optoelectronic transducer 160 is a light signal for outbound transmission that is aligned with and communicated to optical circuit 175 for subsequent signal communication, and an electrical signal for inbound transmission upon receipt of a light signal from optical circuit 175, as discussed above.

Paragraph [0026] of the specification is amended to read as follows:

Electronic chip 110 may be a processor chip, a memory chip, a signal processing chip or any combination thereof or multiple combinations thereof, and substrate 120 may be a multi-chip module (MCM), a dual-chip module (DCM), a single-chip module (SCM), or any other type of first level package substrate, or any combination thereof. Substrate 120 may also be manufactured from a ceramic or an organic material. In an exemplary embodiment, ~~electrical circuit 140 is a~~ metallization layer 140 is formed on surface 202 of transparent substrate 200, having many high speed lines within a single

plane or several planes ~~within the metallization layer~~.

Paragraph [0027] of the specification is amended to read as follows:

In an alternative embodiment of an optoelectronic assembly 300, and referring now to Figure 2, a further degree of heat- spreading is provided via a substrate 220 employed as a heat spreader disposed intermediate heat sink 206 and transparent substrate 200. In an exemplary alternative embodiment, for example, substrate 220 is a SiC substrate 220 can be integrated in the package assembly 100 illustrated with respect to Figure 1. The heat spreader preferably includes a CTE substantially matched to Si, therefore, choices include SiSiC, AlN, or sintered Diamond with a substantially matched coefficient of thermal expansion (CTE), for example. SiC substrate 220 preferably includes mechanical mounting pins (not shown) for properly aligning heat sink 206 with transparent substrate 200 to insure optical alignment between transducer 160 and ferrule 172.